Conference Paper

Academic Integrity in Higher Education: Analysis of Research Publication and Web Citation

Aziman Abdullah[1] and Asar Abdul Karim[2]

[1]Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia
[2]Centre for Modern Language & Human Sciences, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia

Abstract

Higher education is a critical organization for nation-building, either for economic development or social well-being. However, this noble and vital institution has been affected by the issue of "*academic integrity*" due to digital technology adoption, the Internet. Many research studies have been conducted and published, but the impact on the institution and society yet not been properly reported. This study attempts to assess the impact of research on academic integrity by exploring its relationship with web citation. Quantitative method is adopted by analyzing data collected from Google Scholar, SCOPUS, and aHref web analytics cloud service. A strong positive correlation (Pearson's coefficient = 0.915) of the published research works on "*academic integrity*" with web citation can be used as an effective strategy to put research into action in academic integrity. Thus, this study suggests that web citation is a potential metrics that can be used as an effective tool to measure the impact of research in academic integrity.

Keywords: academic integrity, higher education, web citation.

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1. Introduction

In this 21st century, higher education has been challenged with rapid change and constant transformation that opens the door to new opportunities (Wang & Wan Wart, 2007) as well as risks(Downes, 2017). The advancement of the Internet or digital technology has transformed higher education to become more accessible (Amigud, Arnedo-Moreno, Daradoumis, & Guerrero-Roldan, 2018) and affordable with online services (Hayes, Ruschman, & Walker, 2009; Rajnish Kumar, Pritam Desale, 2013). This progress not only comes with the beneficial impact but also together with new opportunities, challenges and risks that significantly affect the future of higher education (Weller & Anderson, 2013; Zorn, Haywood, & Glachant, 2018). Many higher education institutions

have addressed the needs to embrace the Industrial Revolution 4.0, which is about digital technology adoption with the right purpose and strategic. This digital technology is a disruptive may induce risks in higher education when the adoption been implemented without being mindful of the potential implications either in a good or bad. Higher education institution must resilience(Weller & Anderson, 2013), ready with the new paradigm shift (Rogers, 2000; Taatila, 2017) that comes with digital technology. Higher education is one of the critical sectors not only for economic development but also in various aspects of national (Mathews & Hu, 2007) and global sustainability development (Sibbel, 2009). The integrity that significantly defines a civilization (Walton, 2001) must be at the center and core values of the institution. In higher education, academic integrity is an issue that attracts many researchers to study about it. This issue is not only about student, academician and administrator, but affected external stakeholders like policy maker, government, parent, guardian and employer. In fact, issues regarding academic integrity or the case of academic corruption claimed to happen in all institutions in all countries, from the top person till the student (Tierney & Sabharwal, 2017). This paper reviews the context of curriculum where related stakeholders in higher education are involved in academic integrity cases or potential being corrupt in the academic system. There are two objectives of this paper: first, to review the existing literature on academic integrity in higher education, and second, to assess the impact of research of academic integrity on the web. To this end, the paper addresses two research questions:

RQ1: What is the relationship between research publication with web citations in "*academic integrity*"?

RQ2: What is the impact of research publication on "*academic integrity*" in higher education in the form of research citation and web citation?

This study is important for higher education to address the issue of academic integrity affected by digital adoption (Housewright & Schonfeld, 2008).

2. Literature Review

2.1. Integrity Concepts

There are various definitions of integrity, depending on the context of the discussion. The term complexity is challenging to be framed in a single and consistent theory due to different theories advance different aspects of the term (OECD, 2018). In etymology or source of the word, 'integrity' comes from the Latin word, *integras, integer*, meaning comprehensiveness, consistency, and purity(Sumi & Mesner-Andolšek, 2016). In the

area of computer science or digital technology, integrity means differently as compare to social science. Integrity in computer science is referred to as an assurance that information and programs are changed only in a specified and authorized manner (Council, 1991). It is one of the required criteria in the field of cyber security. While in social science, integrity can be viewed at least from eight perspectives (Huberts, 2018) which all of them are referring to a character or values held by individual, group, or organization. In this paper, however, the dominant one claimed by the literature which defines integrity as "professional exercises his tasks adequately, carefully and responsibly, taking into account all relevant interests." The definition in computer science and social science differs based on target actors which one for a machine and the later one is for human. Nevertheless, both are referring to a measurable quality value of trust.

2.2. Academic Integrity

In Islām, integrity places principally as a code of conduct which leads towards the establishment of human ethics. Once a Muslim tries the best to implement the three (3) Islamic aspects of Islāmic world-view which are *tawhīd* (Islāmic ideology), *khilāfah* (vicegerency) and *'adālah* (justice); the person becomes an individual who abides Islāmic teachings in the daily life. He/ she then will reach the highest point of a believer should be, i.e., to become the pious man (al-taqwā). Allāh mentions in the Qur'ān: *"O mankind, We created you from male and female and made you into nations and tribes, that you may know one another. Verily, the most noble of you in the sight of Allāh, is the most righteous of you. Indeed, Allah is Knowing and Acquainted"- al-Qur'ān,* 49: 13, adapted from('Alī, 1994). Building integrity in promoting human ethical foundation in this world life. One of the main elements of integrity is truthfulness. According to al-Ghazali, the truthfulness or sincerity has to appear in five aspects: in speech, intent/ will, determination, keeping promises, and action (Mohd Hasrul Shuhari et al., 2019). Integrity avoids the person to do such characteristics associated with those persons without integrity such as corruption, deception, and treachery. The Prophet says: *"Truthfulness leads to al-birr (righteousness), and the righteousness leads to the Paradise; a man keeps on speaking the truth until he becomes a truthful person. Falsehood leads to al-fujūr (wickedness/ evil-doing), and the wickedness leads to the Hell/ Fire; a man may keep on telling lies till he is written before Allah, a liar"* Ṣaḥīḥ al-Bukhārī, ḥadīth no. 6094 (Al-Bukhārī, 1987)*,* Ṣaḥīḥ Muslim, ḥadīth no: 2607 (Muslim, n.d.). In academic, issues associated with integrity like academic corruption (Tierney & Sabharwal, 2017) or also known as academic fraud such as plagiarism (Maurer, Kappe, & Zaka, 2006),

academic dishonesty (Ercegovac & Richardson, 2014) and cheating(McCabe, Treviño, & Butterfield, 2001) are not new. For example, plagiarism had existed ever since more than a hundred year before (Quain, 1831). Academic integrity is not only about academic work by student or academician; it also covers administrative work in the academic system from the starting process of marketing, admission, graduation and till the end of program accreditation. A previous study (Altbach & Vest, 2005) claimed due to high demand to access to higher education; there is much corruption in university or college admission process especially to the most prestigious universities. This over a decade claim become more significant today after recently Department of Justice in the United States uncovered a conspiracy on college entrance exams and admission to elite universities in the United States that linked with academic corruption (DoJ, 2019). Table 1 summarize the context of academic integrity happened in higher education.

TABLE 1: Academic Integrity in Higher Education Context.

Integrity Case	Context		
	Before	During	After
Cheating for admission (Sharma, 2015)	X		
Bribery for admission (Liu & Peng, 2015)	X		
Plagiarism (Bouville, 2008)		X	
Data fabrication in research (Nurunnabi & Hossain, 2019)		X	
Contract cheating (Amigud & Lancaster, 2019)		X	
Accreditation and licensing fraud (OECD, 2018)			X
Fake degrees/transcript (Grolleau, Lakhal, & Mzoughi, 2016)			X

3. Methodology

This study adopts a quantitative analysis approach for the research methodology. The collected data are based on the contexts of research and action (see Table 2). The rationale of the Web database adopted in this study is because the Web platform can be used to represent the implementation of activities of the higher education on academic integrity. To restrict the searching, a single phrase "*academic integrity*" has been used as a search keyword from all the data source in both contexts.

TABLE 2: Data Collection and Source.

Context	Data source	Parameter	Searching Tools
Research	SCOPUS	Title, keywords, year, citation counts	SCOPUS search
	Google Scholars	Title, keywords, year, citation counts	Harzing's Publish or Perish version 6
Action	Web search	Keywords, number of search interest score	Google Trends web service
	Web pages	Keyword, year, number of web publication, web citation, *social media sharing, web referral	aHref content explorer
*Social media sites included in aHref web analytics service are Twitter, Facebook, and Pinterest.			

4. Results

Table 3 shows the summary of data collection from the targeted sources with the phrase "academic integrity."

TABLE 3: Data Collection and Source.

Indexed database	Number of records	Year range	Date retrieved
SCOPUS	855	1983 - 2020	28 May 2019
Google Scholars	980	1880 - 2018	28 May 2019
Google trend	185	2004 - 2019	28 May 2019
Ahref Content Explorer	5000	1979 - 2019	28 May 2019

Since the time of publications for research and web are not in the same duration for comparison, this study normalized the year range by scoping the year range from 2009 till 2019. Table 4 summarizes the number of publications associated with "*academic integrity*" within those years.

To investigate the relationship between publications and citation in "*academic integrity,*" simple linear regression has been adopted in this study by measuring the Pearson's correlation coefficient of the targeted parameters. The details result of the analysis is shown in Appendix 1 and summarized in Table 5.

5. Discussion

There are two research questions to be discussed based on the findings.

1. RQ1: What is the relationship between research publications with web citations in "*academic integrity*"?

   Based on Appendix 1, this study summarizes: -

TABLE 4: Summary of Publication index and Citation on "*Academic Integrity.*"

	Publication index database				Citation			
Year	Google Scholar	SCOPUS	Google Search	aHref	Google Scholar	SCOPUS	Web Referral	Social Media
2009	68	35	530	23	3060	417	256	254
2010	49	32	596	50	7133	347	630	14271
2011	70	44	691	93	3186	235	878	11175
2012	62	49	784	163	1506	422	1451	11149
2013	64	51	718	247	2645	356	1904	26840
2014	53	75	702	330	1176	429	2591	108317
2015	48	48	688	377	927	148	2928	289935
2016	43	124	739	490	715	269	3027	1331031
2017	25	82	709	1022	662	154	6124	522500
2018	10	95	751	1471	277	120	9194	709642
2019	0	39	332	602	0	12	5649	155073

TABLE 5: Significance Matrix based on P-value (alpha = 0.05).

	Source	Publication				Citation			
		Google Scholar	SCOPUS	Google Search	Web	Google Scholar	SCOPUS	Web Referral	Social Media
Publication	Google Scholar		X	/	/	/	/	/	/
	SCOPUS			/	/	/	/	/	/
	Google Search				X	X	/	/	/
	aHref					X	X	/	/
Citation	Google Scholar						/	X	/
	SCOPUS							/	/
	Web Referral								/
	Social Media								

Note: '/' is significant and 'X' is not significant

a. The relationship between Google Scholar indexing shows a negative, weak relationship with web referral and social media. Considering open access to Google Scholar data, this finding somehow indicates some errors in the conducted methodology. After comparing the data from the web search in Google Scholar, there are major differences between the data retrieved from the Web and the software tool Harzing's that used in this study. The reason for the difference is the limitation of data queries in the Harzing's software is based on 1000 data per query, as shown in Figure 1. The actual number of data retrieved from the Google Scholar web search at the moment this paper been written is 35,400 publications in total. This suggests that a revise searching strategy is required should researcher want to use Harzing's software to retrieve data from Google

Scholar database. Perhaps performing a query based on a single year and compile the data of yearly based query may resolve this limitation.
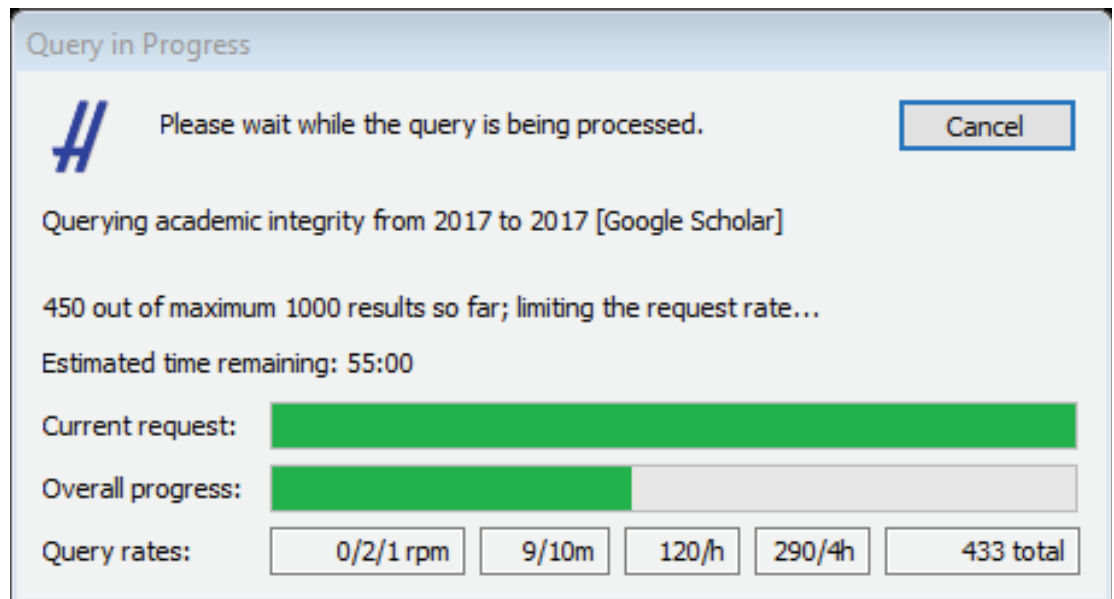

Figure 1: Limitation of Results in Harzing's Software.

b. The relationship between SCOPUS publication and Web referral has a positive correlation with Pearson's correlation coefficient value is 0.523. Since the web is the most practical platform for higher education to engage with stakeholders(O'Haire et al., 2011), this relationship might provide researchers and practitioners two possible scenarios:-

   i. Scenario 1: Research publication in "*academic integrity*" do affect web referral or citations.

  ii. Scenario 2: Research publication in "*academic integrity*" is affected by web referral or citations.

 iii. Scenario 3: Research publication in "*academic integrity*" is a two-way effect on web referral or citations.

c. The relationship between SCOPUS publication with social media is a very strong positive value where Pearson's correlation coefficient value is 0.915. Although SCOPUS database is a subscription-based and usually access limited to subscribe researchers only, this finding indicates that the topic of "*academic integrity*" in published research works and social media has strong connection to each other.

2. RQ2: What is the impact of research publication on "*academic integrity*" in higher education in the form of research citation and web citation?

a. A strong positive relationship between research publications and citation in the publications indexed in Google Scholar indicates that there is an impact of published works in *"academic integrity"* on the research citation and web citation. Table 6 summarizes the impact value of research on citation-based in Appendix 1.

TABLE 6: Research Impact of *"Academic Integrity"* on Research Citation and Web Citation.

Research Publication	Research Citation		Web Citation	
	Google Scholar	SCOPUS	Web Referral	Social Media
Google Scholar	0.52	0.81	-0.88	-0.42
SCOPUS	-0.54	-0.15	0.52	0.92

6. Conclusion

This study has investigated the relationship of research works on "*academic integrity*" with web citation. Findings supported that research impact of "*academic integrity*" can be assessed with web citation and social media sharing. Pearson's correlation coefficient value shows a strong relationship between research publication indexed by SCOPUS to social media sharing. This suggests that web citation can be used as a useful tool to measure the impact of research on academic integrity.

Acknowledgement

Appendix 1: Correlation Matrix of "academic integrity" in publication and citation from 2009-2019

	Data Source	Publication				Citation			
		Google Scholar	SCOPUS	Google Search	Web	Google Scholar	SCOPUS	Web Referral	Social Media
Publication	Google Scholar	1	-0.32	0.38	-0.80	0.52	0.81	-0.88	-0.42
	SCOPUS		1	0.51	0.610	-0.54	-0.15	0.52	0.92
	Google Search			1	0.155	-0.07	0.36	0.01	0.31
	Web				1	-0.61	-0.65	0.98	0.57
Citation	Google Scholar					1	0.49	-0.66	-0.47
	SCOPUS						1	-0.73	-0.34
	Web Referral							1	0.50
	Social Media								1
P-value from T-Test with two tails and paired									
Publication	Google Scholar		0.230	0.000	0.018	0.011	0.000	0.004	0.045
	SCOPUS			0.000	0.015	0.013	0.001	0.004	0.045
	Google Search				0.140	0.066	0.000	0.014	0.045
	Web					0.061	0.309	0.003	0.045
Citation	Google Scholar						0.019	0.381	0.046
	SCOPUS							0.008	0.045
	Web Referral								0.046
	Social Media								

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